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TITLE: Foil bag provided with a punched opening and incisions.

The invention relates to an improvement of a foil bag which comprises flattened and optionally side folded foil bag portions, provided with a sealed bottom.

- 5 Such foil bags, usually manufactured from polyethylene(PE) foil, are used in a packaging-machine, which is operated to open and subsequently position the bag into a box, crate or container. Such a machine is described in Dutch patent nr. 1012033 of the applicant.
- 10 A bundle of foil bags, provided with punched openings and incisions, is suspended upon two pin supports which are inserted through the openings in a known machine. When a flat folded tube shaped foil bag is used the openings are punched through two foil layers. When a side folded foil bag is used the openings are punched each time through four foil layers.
- 15 The openings in the foil bag and the diameter of the pin supports are tuned to each other in such a way that during the first step when the upper edge is to be unfolded off the front side of the foil bag it will not simultaneously pull along the rearward side of the foil bag. As a consequence the machine cycle: foil bag open – spread and hold may lead to serious irregularities in the production process.
- 20 Up till now a measure against such irregularities opening the bag comprises with straight incisions extending from the upper edge of the bag till approximately a 2 mm distance from the upper edge of the opening. This bridged support of approximately 2 mm between the opening and the incision may easily be broken during pulling off of the front side of the foil bag during its opening e.g. by means of a vacuum.
- 25 Yet it appears that in practise such machine opening of a foil bag causes too much disturbances thereby slowing down the production process and also reducing the processing speed. Moreover the tools for providing openings with different diameters to the front and back side are also different. Circumstances of insufficient flow of air into the foil bag during its machine opening also lead to undesirable production disturbances.

The invention is based on the consideration to get rid on the above mentioned production problems of the foil bag itself and to get rid of the problems of opening foil bags with a machine of the prior art. On the one hand by introducing an additional pseudo disturbing measure i.e. by punching openings of the same diameter to the front and rearward side of the foil bag. On the other hand by compensating this pseudo disturbing measure completely by an additional measure increasing air flow into the foil bag during its opening, by leaving out the bridge support between the end of an incision and the opening and by applying such incisions in the foil bag, adjacent or around the openings, so that as a final result the foil bag may be completely opened without any disturbances or irregularities during the production process.

The invention is characterized in that the foil bag is provided adjacent to its upper edge with one or more openings having a diameter which is substantially equal or even greater than the external pin diameter of the support and whereas the foil bag is also provided with at least one foil bag portion provided with one or more incisions in the foil bag material at a certain distance from the opening in a circumferential direction, in such a way that during the opening process of the folded foil bag during a first step the front of the flat folded foil bag portion is pulled off the pin support and consequently during a second step the rearward flat foil bag portion is pulled off from the pin support in such a way that the incisions will remove the undesirable mutually adherence of the foil bag portions by introducing additional air between the opposite adhering foil bag portions while being pulled off the pin support so that the foil bag is completely and easily and problemless opened starting from the front flat foil bag portion whereafter the rearward flat foil bag portion is pulled off further from the pin support.

In the above described embodiment a foil bag is used, flattened or side folded, with external dimensions of 60 x 55 cm and an opening diameter of 10 mm whereby two openings are provided at a distance of 20 mm from the upper edge of the foil bag.

For the use of differently shaped foil bags, for example a cone bag, only one opening may be provided. According to another embodiment of the invention an incision must be provided at a minimum distance from the external circumference

of the opening to secure the suspension of the foil bag upon the pin support in a sufficient way.

Preferably the rearward flat foil bag portion does not present incisions extending from the upper edge to the opening. When the rearward bag portion does not present incisions, particularly when it does not have incisions between the openings and the upper edge of the foil bag, the rearward bag portion may not easily be allowed to be pulled off from the support pins so that as a result, the unfolding or opening and subsequently spreading open of the bag is improved and thereof also the positioning of the unfolded en opened bag into a box, crate or container.

Particularly the forward flattened foil bag is provided with incisions extending from the upper edge to the opening. In this way the bag opening machine will easily pull off the front foil bag portion from the support pins, with little chances on failures.

More particularly the front side folds are provided with openings and incisions similar to the front flattened foil bag portion and preferably the rearward side folds are provided with openings and incisions similar to the rearward flattened foil portion. For a foil bag provided with side folds during its production it is technically advantageous to produce the front side fold together with and identically to the front foil bag portion and to produce the rearward side fold together with and identically to the rearward foil bag portion. It is also advantageous to provide the front side fold with an incision so that also this fold is easily pulled off the support pins.

With respect to the invention it is evident that the position of the incisions and also its external shapes may vary greatly, e.g. as a small(er) perforation, when the condition is fulfilled that additional air can be introduced in a fast way into the bag during its opening by the secured suspension upon the pin support. All the different embodiments are further in detail explained in the claims.

The invention will now be further explained, by means of a drawing.

- Fig. 1 is an embodiment of a side folded foil bag having an opening with incisions and with a schematically perspective top view not showing the bottom seal;
- 5 Fig. 2 shows in a partial front view an opening pattern provided with incisions on or nearby the upper edge in the front side of the foil bag according to Fig.1;
- Fig. 3 shows in a partial front view an opening pattern of a foil bag provided with incisions shaped as perforations;
- 10 Fig. 4 shows a curved line for an incision at an opening;
- Fig. 5 shows a foil bag only provided with incisions in the front portion of the foil bag.

15 Fig.1 shows foil bag 1 partially unfolded and opened provided with passing through openings 6, 6.1, 6.2, 6.3 en 7, 7.1, 7.2, 7.3 on the front side 2, the rearward side 3 and the side folds 4 and 5. For explanation the centre lines 8 and 9 of two pin supports are drawn whereupon a bundle of side folded foil bags is suspended and mounted in the bag opening machine according to the granted patent of the applicant. In this embodiment some incisions 10, 11 are shown so that the intended purpose of additional introduction of air in the foil bag 1 during its opening 20 is achieved. Incisions 10 and 11 are straight lines and extend from the upper edge 12 of the foil bag 1 to the circumferential edge 13 and 14 respectively of an opening 6 or 7 respectively. Moreover, as shown in Fig.2, some additional incisions 15, 16 are provided around openings 6 and 7 to remove the undesirable 25 mutually adherence of the foil bag portions by introducing additional air into the bag while being pulled off the pin support.

Fig.3 shows upper edge of a flat foil bag 17 provided with openings 18, 19 and a straight incision 20 and 21 respectively. In this embodiment some perforations 22, 30 23 are provided around openings 18, 19 which have the purpose to improve the flow of air while pulling off the foil bag from the pin support. The position and the dimensions of the incisions and/or the perforations may be determined by experiment if desired and also depend on and are influenced by the connecting

area and the size of a machine vacuum unit, by which a suction force is exerted on the front side of the foil bag to be opened; to which also relates the amount of movement of the machine vacuum unit while pulling away the foil bag.

Fig.4 shows a curved incision 24. Obviously the length of this curved line 24 between point A and B is greater than the length of a straight incision 25 between the same points A and B. Therefore the flow path of the air is longer for a curved line 24 and as a result is more advantageous for the intended purpose. If preferred an incision line 10 11, 20, 21 may extend e.g. straight from the upper edge of the foil bag to the upper circumferential edge of the opening and then moreover may extend over a length of some millimetres to about 2 centimetres beyond the lower circumferential edge of the opening.

Fig.5 shows a special embodiment of the foil bag with reference numbers corresponding to Fig.1, the rearward foil bag portion or the rear side 3 not being provided with a straight incision, so that the rearward side will pull off less easily from the pin support and as a result the foil bag may be opened and spread open more easily and reliable in the bag opening machine. The forward foil bag portion or the front side 2 as a result is provided with straight incisions 10 and 11 which extend from the upper edge of the foil bag to the openings 6 and 7. Openings 6.2 and 7.2 of the rearward side folds are not provided with incisions similar to the rear side 3 because of production technical reasons. Because pulling off the rearward side folds from the pin support is less critical during operation and it is also possible to provide this side fold with incisions without increasing the chance on disturbances in the machine.

Although in the above mentioned embodiments circular openings 6 and 7 respectively are assumed, it is also possible to provide non circular openings in the foil bag at Fig.1 and Fig.5. Possible are e.g. elliptical openings which may cooperate together with circular or elliptical cross sectional pin supports. Also other completely closed and polygonal openings may be applied optionally while being adapted to the shape of the support pin when the required shear and tensile pulling off movement of the foil bag will not be hindered during its unfolding.

CLAIMS